NOTE ON MORTALITY AFTER OPERATION FOR LARGE INCARCERATED HERNIÆ.

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I MAKE the following report of two fatal cases of hernia, since the lesson to be derived therefrom must prove of exceptional value at the present time, when most cases, no matter how large, of old retained hernia are considered operable.

May 20, 1894, I assisted my friend Dr. John C. Irish, of Lowell, in the following operation:

W. T. B., aged forty-five, had been admitted to the Lowell General Hospital because of an enormous inguinal hernia of the left side. He had been for some time under observation, and an operation was deemed unavoidable, because of the extreme tenuity of the enveloping structures. The integrity of the lower portion of the sac was endangered by the necrosis of the skin, presenting the appearance of a slowly spreading ulcer. The man was of good habits, in good general health, and easy circumstances. He had lived a sedentary life from choice, as also during the later years from necessity. Over six feet in height, he weighed 250 pounds, yet did not seem excessively corpulent.

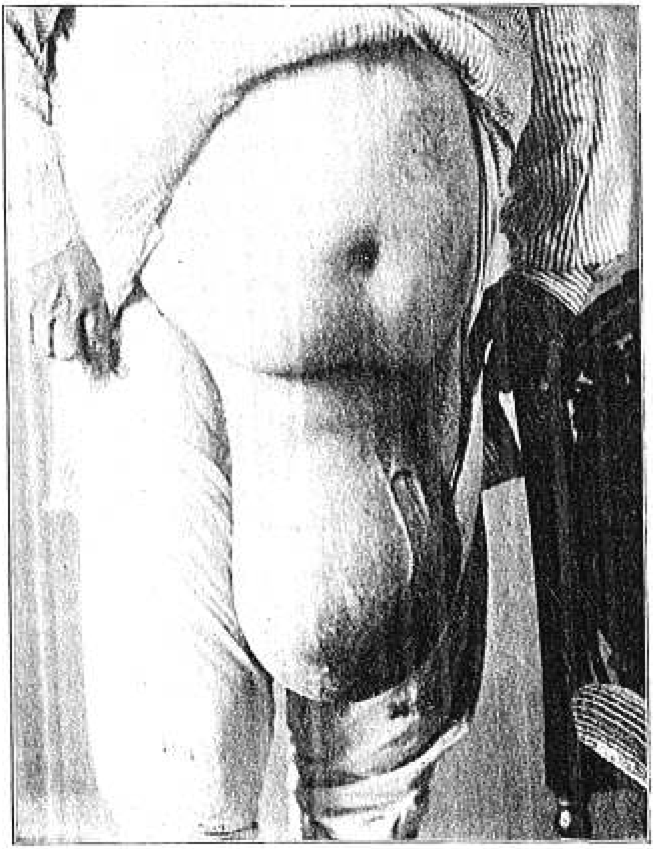
The abdomen, on the contrary, was comparatively thin, with a marked retrocession below the umbilicus. When standing, the tumor extended nearly to the knee, and its largest circumference measured twenty-seven inches. The operation was performed in St. Joseph's Hospital, with the assistance of Dr. M. G. Parker and the other members of the staff.

The contents of the hernial tumor consisted of the larger portion of the large intestine with many fatty epiploicæ and several feet of the small intestine. The extraordinary anatomical feature was the extreme thickness of the mesentery of the large intestines, which presented a fatty infiltration, by estimate more than two inches in thickness. On this account it became necessary to divide the greatly enlarged ring upward nearly to the crest of the ilium. There were no adhesions of importance to the sac, the intestines had been well emptied, and were of normal color and appearance. The patient was placed in the Trendelenburg position, the abdominal wound was held well apart with retractors, and, little by little, the reposition of the intestines was effected. The small intestines were easily returned, together with a considerable portion of the large bowel. The parietal wall of the abdominal cavity did not appear to be unduly rigid, and, little by little, relaxed to receive the displaced organs. The great difficulty was now found to be the restoration of the thickened mesentery, which, after much resistance, suddenly yielded, and the contents of the hernial tumor were completely reduced.

The reduction of the mass was difficult for two reasons. First, because of the lack of storage capacity of the abdominal cavity; secondly, because of the peculiar anatomical condition of the mesentery, already referred to. The abdominal wound was closed in layers, as usual, by buried tendon sutures, and the wound sealed with iodoform collodion without drainage.

Almost immediately upon the reduction of the mass, the respiration became shallow and rapid, with a rather small, rapid pulse. The abdomen seemed unduly distended. Soon after coming out of the ether, the patient began to cough, and expectorated a frothy, bloody mucus, which continued to be the most marked objective symptom until his death, thirty-two hours after the operation. There were no especial symptoms referable to the abdominal organs.

CASE II.—T. B. L., aged fifty-six, of Ogden, Utah, was referred to me by Drs. E. C. Rich, of Ogden, and E. R. Lewis, of Kansas City. He was born in St. Louis, of healthy parents. Since graduation from college had devoted his life to educational work. Never sick or disabled save from hernia of the right inguinal variety. Six feet two inches in height, not over fat, yet weighs 325 pounds. Noted for exceptional physical strength and development. First noticed hernia in 1882, attributed to excessive exertion from horseback-riding in the mountains. The hernia could not be retained by a truss, and soon became scrotal. It was reducible until 1891. At this time it was about half the present size. Has been retained in a suspensory bag supported from the shoulders. First strangulation occurred in Salt Lake City in 1884, again in 1885. Both times it was reduced with the greatest of difficulty. Not strangulated since 1886, but has increased slowly in size up to the present time. He is a great sufferer in every position of the body, oftentimes comparatively little relieved by being in bed. Notwithstanding the enormous size of the tumor, the intestinal function is comparatively little impaired. The body is well nourished, muscles exceptionally well developed. The abdominal wall thickened from fatty deposit. When standing, the scrotal tumor reaches nearly to the knee.



Scrotal tumor measuring fifteen inches from base to pubic bone.

Measurements.—In median line the base of the tumor from the pubic bone, fifteen inches; to the penial opening, five inches; from penial opening to base, ten inches.

Transverse Measurement.—Just below the pubes, twelve inches; four inches below, the narrowest part, eight inches; at the widest part, ten inches. Circumference at base, body attachment, twenty-seven inches; at its largest part, twenty-nine and one-half inches. From pubis to pubis, around the tumor, thirty-two inches. When standing, the entire tumor distinctly pulsates, which can be clearly seen at ten feet distant. For years the penis has been fused in the mass, the opening to which is marked by a deep dimple in the tumor. The right testicle is seen on the surface of the tumor, about six inches below the pubis. Weight of tumor estimated at forty pounds.

Admitted to my hospital July 9, 1899. Put to bed with foot of the bed elevated. Moderate doses of saline cathartics acted readily upon the bowel, inducing a mild diarrhœa. Only beef-tea was administered for thirty-six hours prior to the operation. The chief difficulty apprehended was the want of space in the abdominal cavity for the displaced organs. Retention in bed caused a considerable diminution in size of the tumor, which was more or less resonant throughout. By elevation of the mass, under gentle pressure, the tumor was easily reduced to two-thirds its size when standing.

Keeping in mind the history of Case I, I advised a prolonged rest in bed under diet, to which the patient objected for a variety of reasons. Operation was therefore determined upon, which I performed the morning of July 12, assisted by Drs. Dow and Lockhart, of Cambridge, and Dr. McKechnie, of Somerville. Patient took ether easily, and respiration was unimpeded and undisturbed until after the replacement of the abdominal organs. He was placed in the Trendelenburg position. Incision was made over the tumor from a point opposite the penial opening, which was extended half-way to the crest of the ilium. This free opening readily exposed the contents of the sac. A wide portion of omentum, not much changed in consistency or character, was lifted upward, covering a nest of several feet of small intestine. Through the enlarged abdominal opening these were replaced almost by gravity. There remained nearly the entire large intestine with many fatty epiploicæ, with the mesentery infiltrated with fat, estimated to be fully two inches in thickness. The appendix was the largest I have ever seen, measuring nearly six inches in length, and quite the size of the index-finger.

Little by little the large intestines were restored, with considerable difficulty, to the abdominal cavity, the lower portion being the last to be returned, and, when it finally yielded, it did so with a suddenness quite surprising.

We all immediately remarked the extraordinary distention of the abdominal cavity to aldermanic proportions, quite unexpected, although fully appreciating the enormous size of the tumor. However, the abdominal wall did not seem unduly tense. The omentum was now easily replaced and folded accurately over the readjusted intestines, and retained in position by a pad of gauze. There were only slight adhesions, one or two at the very base of the sac along the outer line of the inguinal ring. The sac was separated from the adjacent parts without much difficulty, sutured across its base, and removed. The testicle was enlarged to more than double its usual size with a most extraordinary elongation of the cord. On this account it was thought wise to remove it. From the point of division of the cord to the base of the testicle it measured twenty and one-half inches. The original opening was estimated to be about five inches in diameter, and this was enlarged so that the opening extended upward nearly on a line drawn from the umbilicus to the crest of the ilium.

The anatomical displacement of the structures was interesting. The fibres of the external oblique were easily traced two inches below the pubis, showing that the external abdominal wall had been displaced downward by the dragging weight of the tumor. The cremasteric fibres were developed to many times their normal size, and, before the completion of the operation, the contraction of the dartos was most remarkable. The omental apron, contained within the hernial sac, was estimated to measure twelve by fifteen inches, and possibly to weigh two pounds.

There were no bleeding vessels of importance, and there now remained simply a large opening in the abdominal wall for closure, as in a laparotomy. The abdominal wound was closed in layers by heavy sutures of kangaroo tendon and the wound sealed with iodoform collodion without drainage. A large well-formed penis now became normally apparent. The operation lasted a little more than an hour. Patient recovered comfortably from the ether without nausea, and was soon in normal consciousness. The respiration, however, which before had been about 16 per minute, rose at once to 40, and the pulse to 136. The temperature prior to the operation was normal, the reactive temperature, twelve hours later, was 102° F., when it slowly declined to an average temperature of about 100°.

The heart's action slowed down in proportion, averaging a little over 100 pulsations per minute, of fair quality until near the last.

The respiration, however, was out of proportion rapid, averaging quite 30 per minute.

Death occurred on the morning of the 20th, the ninth day after the operation. There was at no time much suffering, except from rapidity of respiration. The oxidation of the blood was not especially lessened, a mild catharsis was easily maintained by small doses of salines. There was never nausea, and digestion of small quantities of food, taken often, continued perfect. Sufficient sleep was obtained almost without medication. The urine was abundant and normal in character. The upper portion of the wound partly opened, owing to the tension. Patient continued bright, cheerful, and hopeful to the end. I thought him practically out of serious danger after the second day, notwithstanding the recognition of the greatly increased intra-abdominal pressure. At no time did the distention of the abdomen appear to be materially lessened. Death occurred rather suddenly, with only a few hours' premonition. Autopsy entirely negative. Peritoneal cavity was non-infected. Intestines were normally disposed and not unduly distended. The omentum had remained in its replaced position, and was firmly agglutinated to the abdominal wall at the site of the operation.

Although for many years especially familiar with the literature of operative measures for the cure of hernia, I do not recall any cases where operation has been attempted upon herniæ of such enormous size, or where the histories have been in any way comparable with those above given. It is on this account that I have reported these in more than ordinary detail.

I have operated upon many very large herniæ, every one of which, where the integrity of the intestinal canal has not been involved, made an easy recovery, with the above exceptions. Some of these might be considered enormous,—the larger one, where the tumor measured in circumference eighteen inches, and extended half-way down to the knee. This was probably fully as large as the average adult head. However, there was no disturbance of respiration or circulation.

In what way are we to determine that danger to life may be incurred because of the increase of intra-abdominal pressure, is the problem presented in the present paper.

Certainly, until a very recent date, this question was not likely to arise, since prior to the days of aseptic surgical technique operations of any sort were rarely advocated, unless life was endangered because of strangulation of the intestinal canal. Singularly enough, however, that remarkably clear-sighted surgeon of Paris, George Arnaud, who published his dissertation on hernia in 1748, narrates a case worthy of report in the present connection, together with his quaint comments on the same. ("Dissertation on Hernias or Ruptures, in Two Parts." By George Arnaud, p. 292.)

"Mr. Boudon recommended to my deceased father, a man of forty years of age, and of a very strong constitution. He was extremely fat and six foot and an inch in height, French measure. His name was Mr. Tregneux, was an inhabitant of Clamsey, in the diocese of Auxerre. He had an hernia from his infancy, which had never re-entered. It was thirty-two inches in circumference at its lowest part, nineteen at the ring, and sixteen in length. For more than ten years his penis had been lost in the bulk of the tumor, so that the preputium formed a kind of depression like that of the navel; so that in making water his urine was diffused over all the tumor, which was very troublesome to him. As he was a timber-merchant, his business obliged him almost every day to ride forty or fifty miles on horseback, which induced him to invent a large cavity in the fore-part of his saddle, in which he placed his tumor. Being at last reduced to such a condition that he could no longer follow his business, and being afraid that this disorder, no less terrible than insupportable, would soon put an end to his life, he determined to apply for relief. It was in 1726 that he was introduced to us. He found a great deal of comfort from the recent example which my father and I gave him, of the cure of a similar disorder. He submitted to everything we prescribed, either for his relief or radical cure; but on condition, said he, that he should have a little to eat; for he was a prodigious glutton. Persons of this kind may observe a very strict regimen, even by eating a little. We may therefore recede from the general rule in their favour, without any fear of doing harm; for their great appetite requires this kind of liberty. He was bleeded several times, then purged, and afterwards used twelve or fifteen baths. Twice a day I made strong embrocations of his abdomen with oil of melilot, and covered the whole tumor with a plaister composed of the emplastrum de vigo, prepared with a good deal of mercury, of the diabotanum, and the mucilages, and this I renewed every four days. We made him every morning take ten, twelve, fifteen, or twenty grains of mercur. dulc. He drank plentifully, and had four emollient and purgative clysters injected every day. Every four days we purged him with cassia, with an intention to evacuate the humours, and prevent a salivation. This method succeeded very happily; for the evacuations lasted sixteen days, and were so copious that they every day redoubled the patient's astonishment.

"The tumor during this time had lost about three-quarters of its bulk, and more than a half of the remaining quarter we made to re-enter by taxis; so that the hernia, being thus reduced to one-eighth part of its bulk, was in a condition to be contain'd in the hollow cushion of a truss. It afterwards diminished insensibly for eight or ten days, during which time we took care to fill the cavity of the cushion, in proportion as the bulk of the tumor diminish'd. On the thirty-sixth day from the first venesection, the parts re-entered all together, and the testicle also. We then used a convex instead of the concave cushion. The patient in a very short time resumed his strength and flesh, and follow'd his business with a great deal more vigor than ever he had done. The first thing he did at his return home, was to make his wife pregnant, with whom he had had no amorous converse for ten years before. He quitted the use of the truss eighteen months after; that is to say, in 1728.

"Twelve years after, he had occasion to come to Paris, where he call'd for me immediately on his arrival, rather to testify his gratitude than for any other reason; but as I did not know him, he put me in mind of everything that had happen'd in 1726. I examin'd the parts, which I found so firm and solid, that one could have hardly imagined that he had formerly labour'd under an hernia. The skin of the scrotum was return'd to its natural state, only it was very thick; and the bottom of the scrotum which had approached to the ring on account of the herniary sac of the testicle, was fix'd or glew'd over the ring. This portion of skin seem'd to make a kind of stopper, which fill'd the cavity of it. But tho' the disorder had no appearance of a relapse, I order'd the patient to wear a truss by way of prevention: The reason of which I shall afterwards give in a particular instance. From this observation it is sufficiently evident, that what at first appear'd a paradox, is a truth easily perceived by persons of penetration: but as it may perplex the more ignorant and illiterate part of mankind, I shall, for their sake, render it still more intelligible, by a method of reasoning as clear and perspicuous as I possibly can.

"The parts had insensibly accustom'd themselves to this new abdomen which nature had form'd for them: They had there fix'd a permanent residence for themselves, whence it was impossible for them to remove, on account of the adherences they had contract'd. Without the methodical assistance afforded it was impossible that they should ever of themselves have re-entered the abdomen: But by the disposition into which they were put, they were forced to resume their natural place, tho' they were lean and emaciated, yet when they were reduced, they resumed their former bulk, in the same proportion as all the other parts of the body resumed their flesh. Now they could not slip out again, after they were once in the abdomen, because they were become larger than the diameter of the ring; so that the patient must necessarily have been cured long before he left off the use of the truss. The following fable applied to this subject will more sensibly enable us to comprehend what hinders these sorts of hernias from re-entering and what obliges them to remain in the abdomen, after they are reduced.

"Into a wicker cask, where corn was kept,
Perchance of meagre crops, a field mouse crept;
But when she fill'd her paunch, and sleek'd her hide,
How to get out again, in vain she try'd.
A weasel who beheld her thus disturb'd,
In friendly strain the luckless mouse address'd,
'Would you escape, you must be poor and thin,
To pass the hole thro' which you entered in.'"
HORACE, Lib. I, Epist.

I am quite sure that it is safe to arrive at the conclusion that, in both Dr. Irish's case and my own, the fatal issue is to be attributed to the sudden marked increase of intra-abdominal pressure, especially unduly limiting the function of the diaphragmatic muscle. I think that the teaching of the wise Arnaud should be carried into effect, for a considerable period, before operative measures for the cure of such enormous herniæ should be undertaken.

I have reported the cases with much more than usual detail, since no author has made reference to danger which may arise from this cause. Where any very considerable portion of the abdominal contents have been for a long time displaced, I think it is advisable to submit the patient to quite a period of retention in bed, with a limited diet and moderate purgation. A loss of 10 per cent. in weight may not be excessive, and this will mean not only by that ratio a less amount of abdominal contents present at time of operation, but that there will be a corresponding reduction in the hernial contents to be returned. In even a greater degree will the abdominal wall be thinned and relaxed. Little by little, during this prolonged period of treatment, the hernial tumor will lessen by a more or less spontaneous reduction of the parts, and the circulatory equilibrium also will become more nearly normal. I advise that these factors be taken into careful consideration in every case of old, very large retained hernia to be submitted to surgical treatment. I also think, with the exercise of such care, the conditions must indeed be very exceptional where the cure of hernia may not be safely effected. In a consecutive list of about 500 operations, undertaken by me for the cure of hernia, the case reported is the only one where the danger-line seemed to be approached when the integrity of the intestinal canal was not involved.